VALUE(S) ADDED 7-24-85

FACT SHEET REVISED _____

VALUE(S) REMOVED _____

AMBIENT SURFACE WATER QUALITY STANDARDS DOCUMENTATION

CHEMICAL: Boric acid, borates and metaborates (as boron)

CAS NO.(s): 11113-50-1; 10043-35-3; 1303-96-4

BASIS (Human/Aquatic): Human

WATER CLASSIFICATION: AA; AA-s; A; A-s

STANDARD: 125 ug/l Note B

REMARKS: Applies only to boric acid, borates and metaborates (as boron equivalents)

SUMMARY INFORMATION:

Available toxicity information on boron has been reviewed.[1,2] Numerous accounts of human poisoning by boron compounds can be found in the literature.[1,3] Infant deaths have been reported following exposure via diaper powder, contaminated formula, and breasts (nipples) cleansed with boric acid solution. The effects of subchronic and chronic ingestion of boron compounds (boric acid and sodium metaborate) have been studied in laboratory animals. In one study[4], the ingestion of 120 mg/kg/day boric acid in drinking water had no observable adverse effects on immature rats while 300 mg/kg/day resulted in growth inhibition after 20 to 30 days. In a dietary study[5], the ingestion of 100 mg/kg/day (boric acid) or 155 mg/kg/day (sodium metaborate) had no adverse effects on rats after 2 years exposure while higher levels resulted in growth suppression and gonad degeneration; similar results were observed in dogs. The results of these studies indicate that the toxicologic effects and dose levels at which no effects were observed are markedly similar for boric acid and sodium metaborate (borax) when compared on a boron equivalent basis. In each case, no adverse effects were observed in rats at a daily dose (as boron) of 17.5 mg/kg.

STANDARD DERIVATION:

Using the animal no-adverse-effect level (boron equivalents) of 17.5 mg/kg/day and an uncertainty factor of 1,000, an acceptable daily intake (ADI) of 17.5 ug/kg can be estimated for humans. A criterion of 125 ug/l can be calculated from the ADI, assuming the 20% of the ADI is derived via the ingestion of 2 liters of water per day by a 70 kg human (Section 701.5). The value of 125 ug/l is the recommended standard for boric acid, borates and metaborate (as boron equivalents).

REFERENCES:

(1) Sanusi, et al., 1975, Forensic Science, 6, 165-174.

(2) Schillinger, et al., 1982, Am. Acad. Dermatol., 7, 667-673.

(3) Gosselin, et al., 1976, Clinical Toxicology of Commercial Products, 4th Edition, Williams & Wilkins Co., Baltimore.

(4) Pfeiffer, et al., 1945, JAMA, May, 266-274.

(5) Weir, et al., 1972, Tox. Appl. Pharm., 23, 351-364.

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